

Is it possible to derive Newtonian equations of motion with memory?

Nigmatullin R., Baleanu D.

Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

In this paper for a given example we proved that the Riemann-Liouville fractional integral term appears naturally and relates the external force with acceleration within the fractional Newtonian equation. The consideration of some self-similar process that leads to the fractional integral as well as some possible generalizations of the proposed model was discussed. © Springer Science+Business Media, LLC 2010.

<http://dx.doi.org/10.1007/s10773-010-0249-x>

Keywords

Fractional calculus, Newtonian equation, Riemann-Liouville fractional integral